

Remarks

We have amended the Cross Reference to Related Applications section to reflect the issuance of a patent from one of the referenced applications. We have amended the claims 1 and 10 to specify that the catalyst material comprises manganese or an oxide of manganese (support found on page 37, lines 30-31 of the specification; and in original claims 3 and 12). Claims 2, 3, 11 and 12 have been amended to indicate that the recited materials the can be a component or the catalyst material are *in addition* to the manganese/manganese oxide material present (support found in the paragraph spanning pages 37-38 of the specification, especially “or combination thereof” on page 37, lines 27-28). Claims 4 and 13 have had their dependencies changed to claim 1 and 10, respectively.

Turning to the merits of the invention, Applicants have discovered and claimed a method for accelerating the aging of a catalyst material comprising manganese or an oxide of manganese (sometimes referred to herein as “Mn/MnO_x”). Importantly, the method utilizes a continuous or a substantially-continuous flow of a gaseous composition to achieve a surprisingly accelerated deactivation of the manganese/manganese oxide on a flow volume basis (see page 35, lines 5-8 of the specification). We invite the Examiner’s attention to Example IV on page 41 of the specification, where the significance of the continuous flow on the aging of a cryptomelane is demonstrated. As shown in Figure 4, though the deactivation of an MnO₂ catalyst is approximately the same for the continuous idle aging, continuous rig aging and discontinuous on-road aging, the quantities of air processed in the continuous-flow aging tests were 46% (rig) and 23% (idle) *less* than in the discontinuous-flow on-road aging. In summary, applicants have made the surprising discovery that catalyst deactivation is not simply a function of the exposure to catalyst-deactivating substances, but is also highly dependent on the continuity-of-flow of the deactivating gas. Applicants have identified a “result-effective variable” in the rate of Mn/MnO_x catalyst aging that was not previously recognized.

None of the cited references teaches the claimed invention, specifically, a catalyst aging method that requires the continuous flow of a deactivating gaseous composition over a catalyst material comprising manganese or an oxide of manganese. Moreover, not one reference suggests that continuity-of-flow is a result-effective variable in the rate of catalyst aging, particularly when the catalyst comprises manganese or an oxide of manganese. The courts have held that, where

the prior art has not recognized the result-effective capability of a particular invention parameter, no expectation would exist that simply optimizing the variable would successfully yield the desired improvement. *In re Antonie*, 559 F.2d 618, 195 U.S.P.Q. 6 (C.C.P.A. 1977).

U.S. Patent No. 4,806,517 (“Vanderpool”) is alleged to teach a “continuous flow” of ambient air to accelerate the aging of a titania-supported phosphate catalyst used to convert liquid monoethanolamine (see column 31, lines 28-57). However, the Vanderpool disclosure mentions nothing at all about ambient air flow during the accelerated aging – it only states that “an accelerated aging procedure was used wherein the catalyst bed was held at reaction conditions without [liquid] feed for a period of about 2 weeks,” column 31, lines 48-51. We respectfully submit that the Examiner is reading “continuous air flow” into the disclosure of Vanderpool when there is no basis for such an interpretation. In addition, the present claims, as amended, require that the catalyst composition comprise manganese or an oxide of manganese, which is not taught or suggested in Vanderpool.

U.S. Patent No. 4,987,112 (“Engler”) discloses a catalyst support for detoxifying the exhaust gases of alcohol fueled internal combustion engines. U.S. Patent No. 4,370,260 (“Kim”) discloses a three-way automotive exhaust catalyst consisting of a refractory inorganic oxide support impregnated with a mixture containing platinum and palladium sulfite complex solutions and a rhodium nitrate solution. There is no mention anywhere in Engler or Kim of Mn/MnO_x catalysts, nor the use of ambient air as the deactivating gas (pending claims 5 and 14). Thus, neither Engler nor Kim recognize the result-effective variable of continuous flow of a deactivating gas over a Mn/MnO_x catalyst material, as discovered by the Applicants.

In light of the foregoing, we respectfully submit that the pending claims, as amended, clearly define a novel and non-obvious invention that fully merits patent protection. We therefore respectfully request that the application be allowed in its entirety at an early date. If there remain any issues that the Examiner believes may be resolved by discussion, we cordially invite the Examiner to contact Applicant’s undersigned representative by telephone at any convenient time.

This Amendment is being filed after five months but within six months of the May 21, 2003 mailing date of the Office action. Authorization to charge the fee required for a three-month extension for response, as well as any other fee deemed to be required, to deposit Account No. 05-1070 is hereby granted.

Respectfully submitted,



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